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DISMANTLING THE PUBLIC SECTOR BASTION: EVALUATING CAPITAL WORKS

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STRUCTURED ABSTRACT

Purpose: The determination of the most appropriate procurement system for a capital works project is a challenging task for public sector clients considering the array of assessment criteria that are considered and the procurement methods that are available. This is particularly pertinent to the Western Australian public sector where they have had a propensity to use traditional lump sum as the default procurement solution despite knowing that the selection of an inappropriate procurement method may lead to cost and time overruns, claims, and disputes' on projects. This paper presents a six step procurement method evaluation approach that requires public sector agencies to consider in detail an array of options so as to obtain value for money.

Design/methodology/approach: A procurement evaluation approach is developed and is examined using a focus group of 12 participants comprising of a public sector client, project team and key stakeholders. The focus group was used to examine the developed approach in the context of a real-life capital works project.

Findings: The procurement method evaluation approach was deemed to be pragmatic and enabled decision-makers to re-evaluate outcomes from previous steps in the process. All focus group participants stated the six step process enabled a recommendation that was grounded in reflection and detailed evaluation.

Practical implications: The developed procurement approach has enabled the public sector client evaluate the way in which they view procurement method selection and examine how they obtain 'value for money'.

Originality/value: The six step procurement approach makes use of quantitative and qualitative techniques and is reliant on discourse and reflection in making a procurement method recommendation. Consequently, the approach enables public sector clients to account for the complexities often associated with procurement selection.

Word Count: 3837

INTRODUCTION

The public sector in Western Australia (WA) has used traditional lump sum (TLS) contracts extensively to procure its capital works projects (Love *et al*., 2008). As a result of the continual use of TLS, the market in WA is perceived to be inherently immature and not experienced enough to deal with demands imposed by alternative procurement methods such as public private partnerships (PPP), construction management and management contracting (Love *et al*., 2008). Putting this into the context of an unprecedented boom, which has been founded on a demand for natural resources such as iron ore, nickel, oil and gas and tourism (ABS, 2008) there is an urgent need to deliver capital works. Economic growth for WA is forecasted to rise by 6.5% in 2007 to 2008, 6% in 2008 to 2009, and 5.5% in 2010 to 2011 (ABS, 2008). The boom has resulted in an extreme skills shortage throughout all sectors of the economy and an unemployment rate of 2.8% being experienced. As a result of economic prosperity there has been a dramatic increase in population due to migration, which has placed significant demands on existing infrastructure. In response to the forecasted growth, the State Government has initiated four year capital works plan to expend A$26.1 billion to meet the increased infrastructure demand. With base interest rates at 7.25%, inflation running at 4.2% and an extreme skills shortage many contracting organisations are reluctant to undertake public sector works under a fixed priced contract. Recognising these challenges and the need for the State Government of WA to adopt alternative forms of procurement method to deliver 'value for money' and stimulate innovation, an approach for evaluating procurement options for capital works project has been developed. The approach is described and then is validated by a project team and key stakeholders who were in the process of procuring an A$126 million capital works project. The proposed approach challenges decision-makers within the public sector to re-examine their so called 'bastion', the default TLS, by considering alternative forms of procurement.

CAPITAL WORKS EVALUATION METHOD

Previous research undertaken by Love *et al*. (2008) revealed that a public sector agency in WA had no formal process for selecting a procurement method for their capital works projects. Because of an inherent culture of 'uncertainty avoidance' the TLS was selected without considering in detail other forms of procurement. Love *et al*. (2008) provided a detailed review of the key procurement criteria and tools and techniques that have been previously developed. Each of the tools and techniques developed attempts to cross-reference project variables with existing procurement systems. As a result, Sidwell *et al*. (2001:p.24) state that this "shoe-horns one-off projects and their particular parameters,

priorities and external conditions into off-the-shelf delivery systems". Many of the procurement selection systems developed are inadequate as they:

- ignore an array of factors (e.g., market related);
- are limited in their options available for consideration (i.e. only a few procurement options are considered);
- are conditional and not widely applicable; and
- are simply not user friendly (Alhazmi and McCaffer, 2000).

Essentially, the selection of a project strategy for a capital works project has two components (Mortledge *et al*. 2006):

1. *Analysis* – assessing and establishing priorities for the project objectives and client attitude to risk.
2. *Choice* – considering possible options, evaluating them and selecting the most appropriate.

Taking these two important components into account a pragmatic and reflective approach for evaluating procurement methods is presented.

Six Step Procurement Evaluation Method

A six step approach to the selection of a procurement method for capital works is presented in Figure 1. The identification of project objectives and constraints is pivotal to the selection process and as a result at the end of each step the actions undertaken should be compared with the project objectives and constraints to ensure that they are being considered appropriately. After each step is completed and key decisions are made, the justification for these decisions is carefully documented so as to aid the process of transparency and provide a learning tool for future procurement related decisions.

< Insert Figure 1. Procurement method selection process >

Before the procurement method can be chosen all relevant project information (e.g., the business case, risk analysis) should be reviewed and summarised by the project team members and stakeholders to assist with the choice of a suitable procurement method for a given project. Information derived from these documents should be used to inform the procurement method selection process. There are *two* stages to the procurement selection process.

- *Stage 1* encompasses Steps 1 to 4. During these steps the procurement methods are identified and evaluated during a 'Procurement Review Session' with project team members/stakeholders. Once this session has been completed a number of procurement options will be identified and evaluated using a quantitative weighting approach and a qualitative review process.
- Stage 2 should commence with a review of what has been undertaken and to re-examine the procurement choices made in the context of the project objectives and constraints.

Step 1 - Identification of project objectives and constraints

Once the decision-maker(s) have familiarised themselves with the different types of procurement methods available within the marketplace, the project objectives and constraints should be identified during an initial 'Procurement Review' session (Figure 1). Noteworthy, not all decision-makers will have knowledge or experience with particular procurement methods. Thus, the project manager should endeavour to inform the project team and stakeholders about the underlying conditions for selecting a particular procurement system (Table 1).

< Insert Table 1. Procurement conditions >

Key *project objectives* should address:

- *Programme and phasing* – key milestone dates should be specified such as the target date for the facility to be operational
- *Design criteria* – Is a whole life cycle solution required? Is an attractive architectural statement required reflecting the facility's status in the community? Is there sufficient space to meet the client's immediate and possible future space requirements'? Is the site potential being maximized?
- *Cost certainty* – Has the budget for the project been finalised? Would the final cost of the project expect to vary from the budget cost? Do all works have to be tendered?
- *Other objectives* – In addition to the foregoing project specific objectives should be highlighted and addressed.

Identification of key *project constraints* should address:

- *Programme constraints* – A master programme should be developed for the whole project to review the achievability of the key milestones.
- *Planning* – Is the design sympathetic to the needs of the planning authority and local stakeholders?
- *Site condition* – What type of site? How will contractors price for any risks associated with the site conditions? Have extensive reviews of the site been undertaken as part of the design development process? Is the public agency willing to retain full control of the design and accept the risk of potential unknown risks?
- *State Government procurement procedures* – Ensure procurement strategy complies with WA procurement regulations? How will the project be tendered?
- *Risk allocation* – Is the public agency risk averse? What degree of risk are they prepared to accept?
- *Degree of public agency involvement* – What degree of involvement would the public agency like to have?
- *Flexibility for change during design and construction* – Is cost certainty required? How early in the project will cost certainty need to be fixed? Does the procurement strategy need to be responsive to change
- *Market interest* – Will the procurement method solicit a good response from contractors?
- *Other constraints* – in addition to the foregoing project specific constraints should be highlighted and addressed.

Once the objectives and constraints are identified it should become apparent to experienced project team members which principal procurement systems *could* be considered appropriate (Table 1). At this point a list of possible procurement options that could be used should be identified. The advantages and disadvantages of procurement options identified in the *context of the specific project* should be listed. If more than *four* options have been identified then this listed should be reduced prior to commencing Step 3 by ranking the options in order of preference.

Step 2 - Identify procurement assessment criteria

The New South Wales Department of Public Works (2005) identified 43 criteria to be considered when assessing a procurement option. The weighting of such criteria is time-consuming and tedious. Moreover, the use of such an array of criteria may lead to a sub-optimal solution being chosen. The most commonly used procurement assessment criteria are those identified by NEDO (1985):

1. *Time*: is early completion required?
2. *Certainty of time*: is certainty of time important?
3. *Certainty of cost*: is a firm price needed before any commitment to construction given?
4. *Price competition*: is the selection of the construction team by price competition important?
5. *Flexibility*: are variations necessary after work has begun on-site?
6. *Complexity*: does the building need to be highly specialised, technologically advanced or highly serviced?
7. *Quality*: is high quality of the product, in terms of material and workmanship and design concept important?
8. *Responsibility*: is single point of responsibility the client's after the briefing stage or is direct responsibility to the client from the designers and cost consultants desired?
9. *Risk*: is the transfer of the risk of cost and time slippage from the client important?

Noteworthy, additional criteria can be added to this list depending on the specific nature of the project, the objectives and constraints.

Step 3 - Weighting of client criteria and procurement methods

The importance of each criterion for the public agency should be determined (weighted). The procurement methods identified should be listed and then evaluated according to their suitability using the 'procurement ranking method', which is described below. This ranking method enables an objective assessment to be made against pre-defined procurement assessment criteria. The output of this ranking process should not be treated as indicative, but rather as a guide for the project team to make informed decisions.

A weighted score method is used to evaluate the procurement options that have been initially identified from Step 2. Each criterion for the client is weighted depending upon their relative importance, and the *most* important is awarded the highest weighting. A score is also assigned to each procurement method under consideration. The product of criterion weightings and procurement method scores is calculated for each procurement method. The method with the highest final score is considered as possibility the most suitable method.

The first stage considers the relative importance of identified criteria impinging upon the project. A score for each criterion is weighted (W) using a scale of 1 (low) to 5 (extreme) to reflect their importance to the project. In addition, each criterion is weighted according to its degree of importance and related to the score (P) of each procurement

method using a scale of 1 (poor) to 5 (excellent). The process used to determine the overall weighting for procurement methods is as follows:

1. The procurement assessment criteria shown in Table 2 are weighted according to their *degree of importance* for the specific project to be undertaken on a scale of 1 to 5 (*low, moderate, high, very high, extreme*).
2. The score, on, a scale 1 to 5 (*poor, acceptable, good, very good, excellent*) is awarded to each criterion for each of the available procurement methods in Table 3
3. The product of the client criterion weightings and scores are calculated (shown in column 3) in Table 4.
4. The sum of the products for each of the procurement methods is calculated (shown in the total score row) in Table 4.
5. The preferred procurement method is that with the highest total score

< Insert Table 2. Determination of the importance of client criteria for the project >

< Insert Table 3. Scoring of criteria against procurement method >

< Insert Table 4. Weighted procurement method scoring table >

Step 4 - Procurement appropriateness chart

Each of the procurement methods identified in the 'Weighted Procurement Method Scoring' in Table 4 should be examined in greater detail against more detailed factors within the context of *time*, *cost* and *quality* or factors that have not been previously identified so as to obtain a balanced view of selection using the 'Procurement Appropriateness Chart' identified in Table 5. Comments justifying each procurement method against the project criteria are required. This not only improves transparency in the decision-making process, but also enables learning for future procurement method selection decisions.

< Insert Table 5. Procurement appropriateness chart >

Step 5 - Procurement review session

The second procurement review session should take place a day or more later to allow the project manager and advisors to reflect about the possible procurement solutions that

have been identified. During this session a detailed case addressing advantages and disadvantages of using the identified procurement methods is made and documented.

Step 6 - Procurement option(s)

The consensus preferred option is identified at this stage. The key considerations in reaching this conclusion are the potential overall advantages of this procurement method with regard to the key project objectives and constraints.

PROCUREMENT PROCESS VALIDATION

Focus Group

The focus group was used to elicit viewpoints and examine about the application of the proposed approach for a real-life capital works project. Unlike conducting multiple individual interviews, participants in the focus group can listen to and comment on each other's original responses, discussing their perceptions and ideas with each other in an often enjoyable and comfortable shared environment (Patton, 2002). The feedback obtained from focus group is also deemed to be more specific, animated and meaningful than the feedback from individually completed interviews and questionnaires (Patton, 2002).

The focus group was used to gather information relating to the views and opinions of the participants in a non-threatening environment. As a common method of selecting participants for focus groups, convenience sampling was used. Essentially, participants for the public works department were selected for their familiarity with the project procurement selection process of their organisation. All project team members and key stakeholders were invited to attend a focus group. The workshop comprised of 12 stakeholders who included the project director, finance manager, project managers, client, architect, quantity surveyor, and users of the project.

Ideally focus groups should contain between 6 and 12 participants (Stewart and Shamdasani, 1990). While the focus group progressed, participants were given freedom to discuss issues, listen to fellow participants, provide reflective comment and arrive at a shared understanding of collective experiences regarding the procurement selection process proposed. Whilst working with the group the facilitator appeared to be 'genuinely naïve' and avoided leading questions so as to allow corroboration to naturally occur. The focus group session was digitally recorded and a copy of the session was transcribed and provided to participants for review.

Observations, Testing and Validation

The focus group participants were all involved with the procurement of A$126 million 'Greenfield' capital works project with an anticipated construction period of three years. Because the project is still in its early stages of development only limited information is able to be presented.

The group consisted of 12 people who represented the client, project team and key stakeholders. An independent person was used to facilitate the evaluation process so as not to introduce any form of bias throughout each of the steps. The process commenced with identifying the project objectives and constraints. In this principle this should have been a straight forward process, however, it soon became evident that all participants had different views about what the key project objectives and constraints were. This was surprising as each participant had a copy of the project's management plan at their disposal. The public sector client stated:

> "We want the project delivered on time, and on budget. We want value for money and the best way of getting this is to use a traditional lump sum contract. We have had a bad experience with design and construct"

Two other participants concurred with this viewpoint and then the discussion proceeded to focus on the use of the TLS. However, concerns were raised by several participants about automatically advocating a method prior to evaluating other possible solutions. It was perceived that several participants were reluctant to commence the procurement evaluation process in a systematic way because their lack of knowledge of other forms procurement may come to light. The project manager took control of the meeting explaining the importance of the process. The project manager specifically stated:

> "the process is transparent and we can formally justify to Cabinet and Treasury why we have selected a particular route. We shouldn't go into this thinking we are going to use a lump sum method. At the moment we have a skills shortage and no contractor is going to give us a fixed price at the moment. We have to think about market conditions, and what way is best to deliver this project".

The project management plan for the project that was being discussed had been undertaken sometime before the issue of the procurement method had been considered. The introduction of a process where the procurement method was to be evaluated had enabled participants to reflect and re-consider issues that had been identified in the 'business case'. In fact, one participant stated:

> "I think we should have considered the procurement method during the business case. I don't we can consider it in isolation. Perhaps this process should come earlier?"

There was the potential for project objectives and constraints to change from when the business case had been undertaken, especially within the current economic environment. Thus, it was suggested that an initial process for determining possible procurement options should be commenced when the business case is being established and more detailed evaluation as presented above. Thus, the proposed evaluation process would confirm the initial recommendation made during the business case or suggest an alternative approach based upon any changes project constraints or objectives that may have arisen.

During the business case preparation funding and budgets are established and allocated so it was deemed imperative to consider the procurement method at the earlier stage. For example, one participant stated that the proposed approach did not allow for the consideration of PPP options. The proposed approach ignores PPP related methods because the decision whether to use this approach has been traditionally been related to political and financial reasons and taken by the Department of Treasury. Moreover, there has been very limited use of PPPs in WA and they have not been typically ascribed to the public sector's procurement portfolio like they are in the States of Victoria and New South Wales. Eschewing PPPs is considered to be a major limitation of the approach, though it is an issue that will need to be addressed in the future.

The focus group spent more than an hour discussing the project objectives and constraints for their specific project and suggested two possible procurement options: TLS and Design and Construct (D&C). Step 2 focused on the selection criteria and those identified were deemed to be appropriate for purposes of evaluation. However, the criterion of funding, that is, ' does the State want to fund the project?', was suggested to be included but this is related to the use of PPPs and so can be addressed in the business case. Additional criteria that address time and cost risk were identified, but these issues had been deliberated upon in the formative stages of a project. The weighting of the procurement criterion was a straightforward process for participants for their project, with emphasis being placed on cost and time.

The weighting of the criteria against the procurement methods that were identified, in this case TLS and D&C, was not as straightforward as it was expected. in this section of evaluation the weightings are deemed to be constant and should not change. However, the public sector agency who was procuring the project insisted on giving the TLS scores of

4 (very important) and 5 (extremely important) for each of the criteria and generally lower scores for D&C. Besides the public sector client, all participants agreed that D&C was able to deliver a project quicker due to design and construction processes occurring in parallel. The public sector client however, was insistent that D&C was slower because of the time required to develop a performance specification and tender the works to an appropriate contractor. The public sector client also made a point of stating that cost certainty was unequivocal with the TLS approach. However, the concept of cost certainty is a fallacy in the context of traditional approaches that are based upon full drawings and bills of quantities. In principle this approach should provide a client with a firm, fixed price for construction but in practice very few projects are actually completed within the tendered price (Rowlinson, 1999). Complete drawings and BoQs are generally not available when a projects goes to tender. Rowlinson (1999) therefore asks why do clients' continue to use this method when it can be argued that it leads to:

- a lack of flexibility;
- a price to pay in terms of claims-conscious behaviour;
- the fallacy of cost certainty; and
- a release of control by the client organisation

No consensus regarding the weighting of the criteria against the procurement method could be achieved in light of participants' different experiences with procurement methods. It was agreed among the participants that a third party with an objective view of procurement would be more suited to undertaking this process. The procurement assessment chart was considered to be an invaluable step in the process as it enabled the participants to discuss in detail the merits of various methods against more specific criteria. Participants deemed steps 4 and 5 to be most effective enabling reflection and discourse to take place, something that had not occurred before. Overall the proposed approach was well received by the focus group participants and all were satisfied with the solution that been determined within a three hour period. The process was considered to be transparent and reflective and a no point in the process was the choice of procurement method deemed to be *fait accompli*.

CONCLUSIONS

The determination of the most appropriate procurement system for a capital works project is a challenging task for public sector clients considering the array of assessment criteria that are considered and the procurement methods that are available. The selection of an inappropriate procurement method may lead to cost and time overruns, claims, and disputes. Learning from previous experiences with regard to procurement selection can

provide public sector clients with knowledge about how to best deliver their projects. Repeatedly using a traditional lump sum method is not an effective way to obtain value for money and meet the demands being imposed on the State for capital works. A procurement evaluation method that enables decision-makers to consider other forms of procurement was developed and tested on a major capital works project. The initial examination of the process identified areas that could be improved, specifically with regarding to Public Private Partnerships, but with further testing and refinement it is anticipated that it may become an inherent feature of the State Governments *Strategic Asset Management Framework.*

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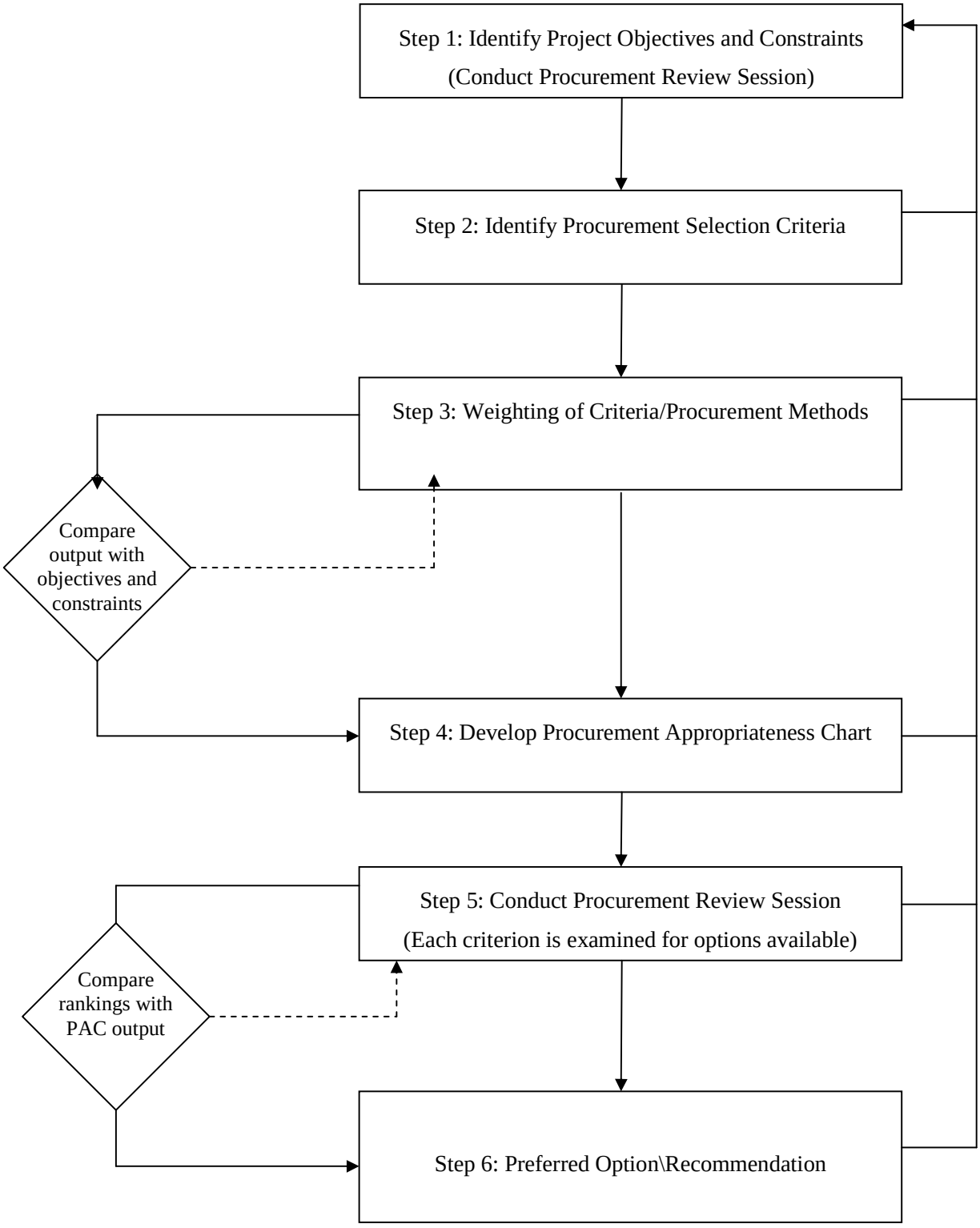

Figure 1. Procurement method selection process

Table 1. Procurement conditions

Traditional should be used when:
• a programme allows sufficient time; • consultant design is warranted; • a client wishes to appoint designers and constructors separately; • price certainty is wanted before the start of construction; • product quality is wanted; and • a balance of risk is to be placed between the client and constructor.
Design and construct should be used when:
• a building is functional rather than prestigious; • a building is simple rather than complex, is not highly serviced and does not require technical innovation; • a brief for scope design is unlikely to change; • a firm price is needed in advance of construction; • a programme can be accelerated by overlapping design and construction; and • a single organisation is required to take responsibility and risk for design and construction.
Management should be used when:
• an early start to construction and early programme of completion, requiring design and construction to proceed in parallel, is wanted; • flexibility in design is wanted to allow for changes to be made as the process of design and construction are carried out; • a project by its nature is organisationally complex, probably with a need to manage a multiplicity of client, consultant and contractor organisations; • a project is technologically complex resulting from often differing requirements for future users; • a client and his advisers have insufficient management resources; and • maximum price competition for the works element is wanted

Table 2. Determination of the importance of client criteria for the project

Procurement Assessment Criteria	**Weighting**
Time: Is early completion required?	
Certainty of time: Is certainty of time important?	
Certainty of cost: Is a firm price needed before any commitment to construction given	
Price competition: Is the selection of the construction team by price competition important?	
Flexibility: Are variations necessary after work has begun on-site?	
Complexity: Does the building need to be highly specialised, technologically advanced or highly serviced?	
Quality: Is high quality of the product, in terms of material and workmanship and design concept important?	
Responsibility: Is single point of responsibility the client's after the briefing stage or is direct responsibility to the client from the designers and cost consultants desired?	
Risk: Is the transfer of the risk of cost and time slippage from the client important?	

Using scale 1 to 5, weight the criteria for the project

Importance Scale:
1 = low
2 = moderate
3 = high
4 = very high
5 = extremely

This value is inserted in Table 3 in column 2

Table 3. Scoring of criteria against procurement method

Procurement Assessment Criteria	**Col. 2** Procurement Option 1	**Col.2** Procurement Option 2	**Col.2** Procurement Option3
Time: Is early completion required? *Certainty of time:* Is certainty of time important? *Certainty of cost:* Is a firm price needed before any commitment to construction given *Price competition:* Is the selection of the construction team by price competition important? *Flexibility:* Are variations necessary after work has begun on-site? *Complexity:* Does the building need to be highly specialised, technologically advanced or highly serviced? *Quality*: Is high quality of the product, in terms of material and workmanship and design concept important? *Responsibility:* Is single point of responsibility the client's after the briefing stage or is direct responsibility to the client from the designers and cost consultants desired? *Risk*: Is the transfer of the risk of cost and time slippage from the client important?	*P* *This value is used in Table 4 and inserted into column 3*		

Procurement Performance Scale:
1 = poor
2 = acceptable
3 = good
4 = very good
5 = excellent

Table 4. Weighted procurement method scoring table

Procurement Assessment Criteria	**Col.2** **Clients' Weighting**	**Col 3** Procurement Option 1	**Col 3** Procurement Option 2	**Col 3** Procurement Option 3
Time: Is early completion required?	*W*	*W* x *P*	*W* x *P*	*W* x *P*
Certainty of time: Is certainty of time important?				
Certainty of cost: Is a firm price needed before any commitment to construction given				
Price competition: Is the selection of the construction team by price competition important?				
Flexibility: Are variations necessary after work has begun on-site?				
Complexity: Does the building need to be highly specialised, technologically advanced or highly serviced?				
Quality: Is high quality of the product, in terms of material and workmanship and design concept important?				
Responsibility: Is single point of responsibility the client's after the briefing stage or is direct responsibility to the client from the designers and cost consultants desired?				
Risk: Is the transfer of the risk of cost and time slippage from the client important?				
$\sum$				

Table 5 Procurement appropriateness chart

Key	☺ Good	😐 Average	☹ Poor

Time	Procurement Option 1	Procurement Option 2	Procurement Option 3	Procurement Option 4
Completion date certainty (once let)				
	Comment:			
Ability to meet current programme				
	Comment:			
Facility to phase construction				
	Comment:			

Cost	Procurement Option 1	Procurement Option 2	Procurement Option 3	Procurement Option 4
Cost certainty prior to major commitment.				
	Comment:			
Transfer of cost risk				
	Comment:			
Competitive tendering in current market conditions				
	Comment:			

Quality	Procurement Option 1	Procurement Option 2	Procurement Option 3	Procurement Option 4
Ability for contractor to add value in design development				
	Comment:			
Flexible to accommodate change orders				
	Comment:			
Single point responsibility for design & construction				
	Comment:			
Ability to control / respond to unknowns site conditions				
	Comment:			
Client retains control over development of design				
	Comment:			